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WATER QUALITY MEMORANDUM
Utah Coal Regulatory Program

September 15, 2010

TO: Internal File

THRU: James D. Smith, Permit Supervisor

FROM: Steve Christensen, Environmental Scientist SKC

RE: 2010 1st Quarter Water Monitoring, Canyon Fuel Company (CFC), LLC, Dugout Mine, C/007/0039-WQ10-1, Task ID #3475

The Dugout Canyon Mine is currently operational in the Book Cliff Mountain range of Carbon County, UT. Water monitoring data is submitted quarterly to the Division EDI database. Beginning on page 7-40 of the approved Mining and Reclamation Plan (MRP), water monitoring protocols and sampling requirements are provided for surface water, ground water, monitoring wells and Utah Pollutant Discharge Elimination System (UPDES) outfalls. Tables 7-4 and Table 7-5 list the individual monitoring sites and their sampling protocols for ground water and surface water respectively.

1. Was data submitted for all required sites?

Springs YES [X] NO [ ]

The approved MRP outlines the operational and post-mining monitoring of fourteen springs (200, 203, 227, 259 259A, 260, 321, 322, 324, SC-100, SC-116, SC-14, SC-65 and SP-200). The locations of these springs are depicted on Plate 7-1, Hydrologic Monitoring Stations. Groundwater discharge from the old Gilson coal seam workings is also monitored and identified as location MD-1.

Spring 200 had not reported a measurable flow since the 2nd quarter of 2001. Spring 227 has never reported a measurable flow. Spring 259 last reported a measurable flow in the 3rd quarter of 2001. Spring SC-100 has not reported a measurable flow since the 2nd quarter of 2008.

Of the 14 spring monitoring sites, only Site 227 could be accessed. The remaining 13 sites were inaccessible due to snow and ice cover.

Streams **YES [X] NO [ ]**

The approved MRP outlines the monitoring of thirteen stream sites (323, DC-1, DC-2, DC-3, DC-4, DC-5, FAN, PC-1A, PC-2, PC-3, RC-1, SS-1 and SS-2). Sites DC-4 and DC-5 are sampled during the first wet or dry year as conditions permit. The locations of these streams are depicted on Plate 7-1, Hydrologic Monitoring Stations.

Six of the stream monitoring sites were inaccessible to snow and ice cover. Five of the stream monitoring sites were accessible with two producing a sufficient flow to obtain a sample (DC-1 and PC-2).

Wells **YES [X] NO [ ]**

The approved MRP outlines the sampling of three monitoring wells (GW-10-2, GW-11-2 and GW-24-1). Table 7-4 and Section 731.200 of the MRP specify that the Permittee will obtain quarterly water level measurements from the wells. Due to the ages of the wells and deterioration of the casing materials, water quality data is not collected.

Monitoring well GW-24-1 became blocked during the winter of 2000 and was last sampled in September of 1998. The well was removed from monitoring after the 4th quarter of 2004. Monitoring well G-11-2 was last monitored in October 2007. Since that time, the Permittee has reported that the well has appeared to have "caved in". Monitoring well GW-10-2 is still functioning and actively monitored for water level.

Though not required by the approved MRP, three additional monitoring wells (DH-1, DH-2 and DH-3) are monitored at the waste rock disposal site. Water levels are monitored quarterly with additional water quality sampling obtained from DH-1 during low flow periods (i.e. 3rd or 4th quarter).

Depths were recorded for wells DH-1, DH-2 and DH-3. Wells GW-10-2 and GW-11-2 were inaccessible due to snow and ice cover.

UPDES **YES [X] NO [ ]**

Operational monitoring is required monthly for six active UPDES outfalls (Permit No. UT0025593):

- **001**-Mine water discharge to Dugout Ck.,
- **002**-Sedimentation pond discharge to Dugout Ck. (disturbed area runoff),
- **003**-Storage water discharge to Dugout Ck. (30,000-gallon water tank discharge),
- **004**-Sedimentation pond (waste rock site) discharge to Grassy Trail Ck. Tributary,
- **005**-Pace Canyon fan portal breakout, mine water discharge to Pace Ck.

- **006**-Sediment trap culvert discharge to Pace Creek (disturbed area runoff from Pace Canyon Fan facility).

Specific effluent limitations and self-monitoring requirements as outlined in the UPDES permit are presented below:

Effluent Characteristics	Effluent Limitations
TDS, tons/day	1.0
Total Suspended Solids (TSS), ppm	70
Total Iron, ppm	1.1
Oil & Grease, ppm	10
Total Dissolved Solids (TDS), ppm	2,400
pH	9

3,000 parts per million (ppm) is the water quality standard for total dissolved solids (as established by the Department of Water Quality) for both Pace Creek and Dugout Creek.

UPDES outfalls 001, 003 and 005 produced a discharge this quarter.

2. Were all required parameters reported for each site?

Springs **YES [X] NO [ ]**

Only spring 227 was accessible this quarter. A flow of 0 gallons per minute (gpm) was recorded.

Streams **YES [X] NO [ ]**

Two stream monitoring sites produced a sufficient enough flow to obtain a sample (DC-1 and PC-2). The required parameters were reported for these sites.

Wells **YES [X] NO [ ]**

Of the three monitoring wells that were accessible this quarter (DH-1, DH-2 and DH-3) the required parameter (depth to water) was reported.

UPDES **YES [X] NO [ ]**

Of the three UPDES sites that reported a discharge this quarter (001, 003 and 005), the required parameters were reported.

3. Were irregularities found in the data?

Springs **YES [ ] NO [X]**

Streams **YES [X] NO [ ]**

DC-1 reported several values outside of two standard deviations of the data set. The site has historically produced erratic D-Na trends typified by spikes in the late spring/early summer. The previous quarter (4th quarter 2009), the reported D-Na value was within two standard deviations of the mean; however, an elevated value was reported this quarter. In addition to D-NA, spikes were reported for field conductivity, Chloride and Bicarbonate. CONTINUED MONITORING

Monitoring site DC-2 reported several parameters outside of two standard deviations the previous quarter: dissolved potassium (D-K), dissolved sodium (D-Na), chloride (Cl) and total dissolved solids (TDS). The site was inaccessible this quarter due to snow and ice. Continued monitoring will be conducted in order to determine if a trend is developing.

The FAN monitoring site below the Pace Canyon Fan portal has reported elevated levels of D-Na, Cl, sulfate (SO4) and total alkalinity the two previous quarters. However, the site was inaccessible this quarter due to snow and ice conditions. Continued monitoring will be conducted in order to determine if a trend is developing.

Site PC-2 has developed an upward trend in TDS and its associated components. The previous three quarters had shown an upward trend in TDS and this quarter continued that trend with elevated values reported for field conductivity, D-Ca, D-Mg, D-K, D-Na, Cl, SO4, TDS, T-Cations and T-Anions (See chart below). The water quality standard for Pace Creek (as established by the Division of Water Quality) is 3,000 mg/L. The reported TDS value for this quarter is 1,150 mg/L. Although the concentrations are well within the standard, continued monitoring will be conducted.

Wells **YES [ ] NO [X]**

Water level readings obtained from wells DH-1, DH-2 and DH-3 were within established trends.

Monitoring well GW-10-2 had reported depth to water values outside of two standard deviations the two previous quarters. However, the well was inaccessible this quarter due to snow and ice cover. Continued monitoring of water levels in well GW-10-2 will be conducted to ascertain if a downward trend is emerging.

UPDES **YES [ ] NO [X]**

UPDES outfalls 001, 003 and 005 produced flows during this quarter.

Based upon six measurements this quarter, Sites 001, 003 and 005 averaged flows of 276 gpm, 175.3 gpm and 400 gpm respectively.

All three sites reported concentrations within the requirements as established by the UPDES Discharge permit for pH, TDS, T-Fe and TSS.

4. On what date does the MRP require a five-year resampling of baseline water data.

The resampling of baseline data will next be performed in July 2014. In addition, one water sample will be collected at each spring sampling point during low flow period every fifth year, during the year, preceding re-permitting. These samples will be obtained for the analysis of baseline parameters (See Table 7-4).

5. Based on your review, what further actions, if any, do you recommend?

Continued monitoring of stream monitoring sites DC-1, DC-2, FAN and PC-2 for upward trends in TDS and its chemical constituents.

Once accessible, continue to monitor well GW-10-2 for potential downward trend in water depth.

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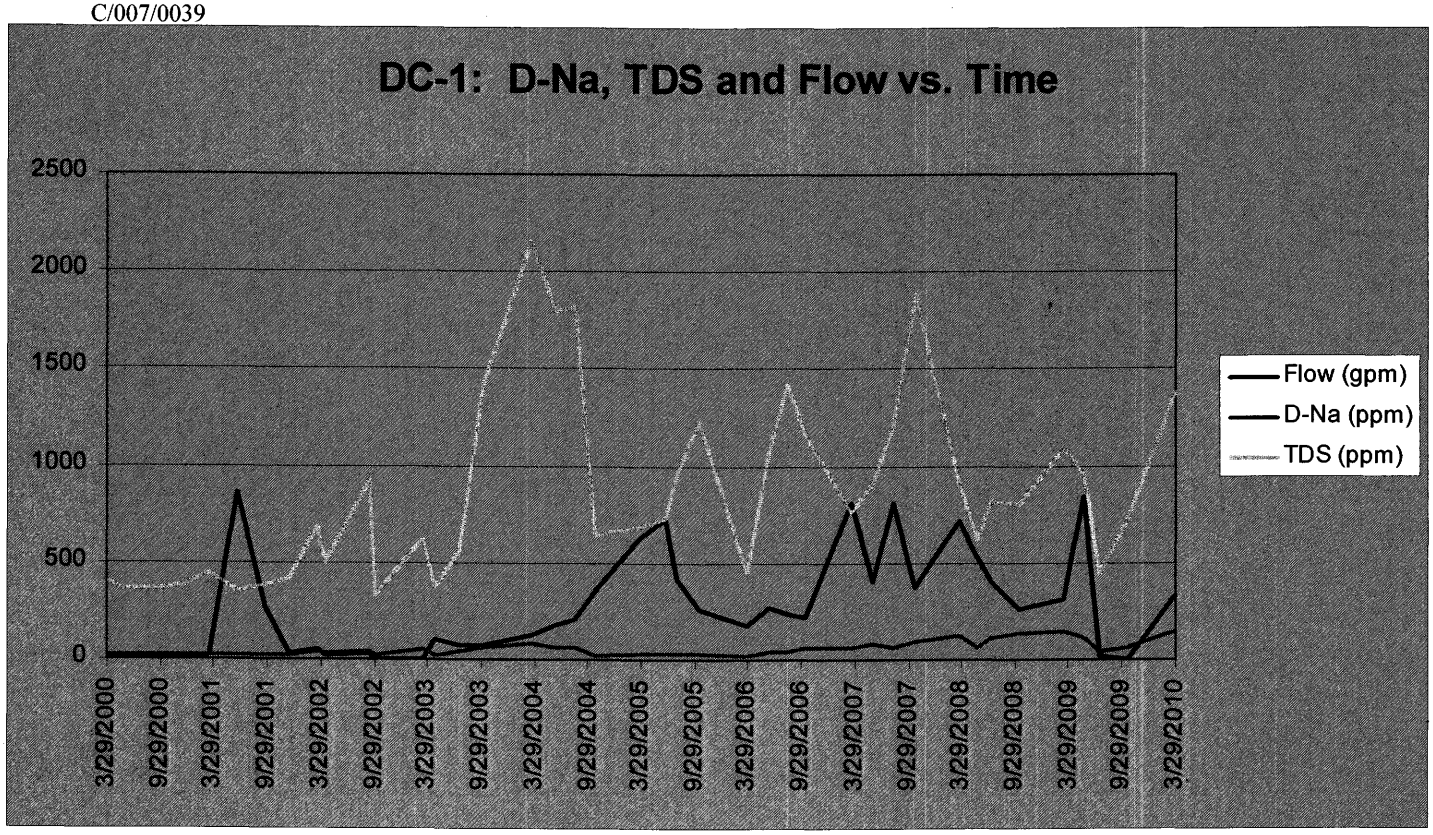
DC-1: D-Na, TDS and Flow vs. Time
2500
2000
1500
1000
500
0
3/29/2000
9/29/2000
3/29/2001
9/29/2001
3/29/2002
9/29/2002
3/29/2003
9/29/2003
3/29/2004
9/29/2004
3/29/2005
9/29/2005
3/29/2006
9/29/2006
3/29/2007
9/29/2007
3/29/2008
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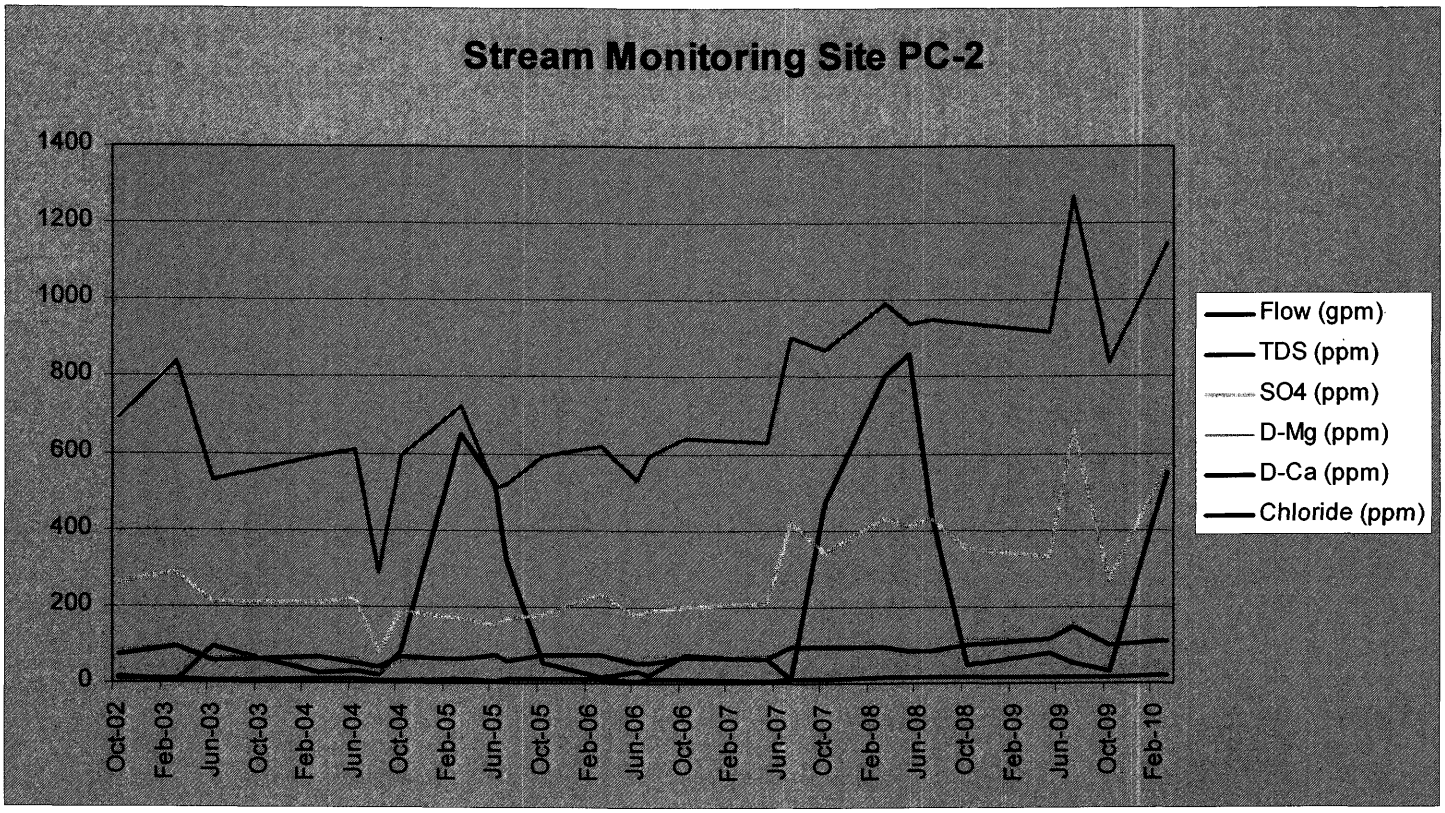
3/29/2009
9/29/2009
3/29/2010
Flow (gpm)
D-Na (ppm)
TDS (ppm)


Stream Monitoring Site PC-2
1400
1200
1000
800
600
400
200
0
Oct-02
Feb-03
Jun-03
Oct-03
Feb-04
Jun-04
Oct-04
Feb-05
Jun-05
Oct-05
Feb-06
Jun-06
Oct-06
Feb-07
Jun-07
Oct-07
Feb-08
Jun-08
Oct-08
Feb-09
Jun-09
Oct-09
Feb-10
Flow (gpm)
TDS (ppm)
SO4 (ppm)
D-Mg (ppm)
D-Ca (ppm)
Chloride (ppm)